UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/581,371	04/19/2007	John T. Groves	LBNL.001NP	9474

20595 7590 05/13/2009

KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER	
SNYDER, STUART	
ART UNIT	PAPER NUMBER
1648	

NOTIFICATION DATE	DELIVERY MODE
05/13/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jcartee@kmob.com
eOAPilot@kmob.com

Office Action Summary	Application No.	Applicant(s)	
	10/581,371	GROVES ET AL.	
	Examiner	Art Unit	
	STUART W. SNYDER	1648	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 March 0209*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) *1-17* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

1. Claims 1-32 are pending; claims 1-17 are withdrawn from examination pursuant to Applicants' response to the Examiner's restriction requirement by election of Group I without traverse.

2. Amendment of Claim 30 in Applicant's filing of 3/9/2009 is acknowledged.

Claim Objections

3. Objection to Claim 30 for a spelling error is **withdrawn** in view of amendment of the claim.

4. Objection to Claims 18 and 28 for word usage is **withdrawn** in view of Applicants' remarks.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 18, 25, 27-28, and 32 stand rejected under 35 U.S.C. 102(b) as being anticipated by Tang, *et al.* (NAR, Suppl. 1, 2001; pages 165-6). The claims are drawn to an assay system for detecting the binding of an analyte to a ligand comprising a suspension of colloidal particles near a dynamic phase transition state, a ligand associated with said particles specific for said particles and a device to determine colloidal particle phase transition in the presence of the

specific ligand (claims 18 and 28). Further limitations include the following: The ligand is not covalently liked to the colloidal particles (claims 25 and 32); and the phase transition is from a dispersed state to a condensed state (claim 27).

Tang, *et al*. (NAR, 2001) teaches that a conjugate of a thermo-responsive polymer and ODN (dT_{12}) formed disperse nanoparticles with a lower critical solution temperature (LCST) of 37.6° C. However, at 40° C, but not at 60° C, and in the presence of dA_{12}, but not (dA_6)dT(dA_5), rapid aggregation of the nanoparticles occurred as evidence by rapid decrease in transmittance of 500 nm light through solutions of the former, specific ligand/conjugate but not the latter, non-specific ligand/conjugate (see figure 3). Thus, each and every limitation of the claims is taught by Tang, *et al*. (NAR, 2001).

Applicant's arguments filed 3/9/2009 have been fully considered but they are not persuasive. Applicant incorrectly refers to a non-Patent Literature (NPL) reference to which the Examiner did not cite in the previous Office Action. Because of this error, Applicants' arguments are moot, not germane and therefore are not persuasive.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 19-21 and 30 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, *et al.* (NAR, 2001) as applied to claims 18, 25, 27-28, and 32 in view of Singh, *et al.* The limitations of claims 18 and 28 are summarized above (see section 6); claims 19-21 and 30 add the following limitations to the independent claims: The colloidal suspension comprises two independent particle populations (claim 19) which are distinguishable by size (claim 20) or by differential labeling of the particles (claim 21); and may be detected by a fluorescence detector (claim 30).

Singh, *et al.* teach methods and materials for separation and analysis of complex materials including biological materials. Separation and analysis depends on use of differentially labeled nanoparticles used to capture desired analytes and to distinguish the various populations of analyte/nanoparticles. Distinguishing characteristics of the nanoparticles include size and composition of the nanoparticles; the latter aspect may be distinctive fluorescence profiles. Thus, Singh, *et al.* teaches each and every limitation of claims 19-21 and 30.

It would have been obvious for a skilled artisan to use at least two populations of nanoparticles in diagnostic compositions. The skilled artisan would be motivated to use at least two populations of nanoparticles to analyze complex biological compositions comprising two or more analytes of interest (see Singh, *et al.*, abstract and introduction) whilst minimizing sample size or other analytical resources. The skilled artisan would have reasonable expectation of success because of the wide spread use of multiplex technology comprising nanoparticles

especially in the flow cytometric arts. Thus, the invention of claims 19-21 and 30 are prima facie obvious in view of Tang, *et al.* and Singh, *et al.*

Applicant's arguments filed 3/9/2009 have been fully considered but they are not persuasive. Applicant incorrectly refers to a non-Patent Literature (NPL) reference to which the Examiner did not cite in the previous Office Action. Because of this error, Applicants' arguments are moot, not germane and therefore are not persuasive.

7. Claims 22-24 and 31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, *et al.* (NAR, 2001) in view of Schaertl, *et al.* (J Biomol Screen, 2001). The limitations of claims 18 and 28 are summarized above; the instantly rejected claims add the following limitations: the colloidal particles comprise a lipid layer (claim 22); the lipid layer further comprises a natural cell membrane (claim 23 and claim 31); and the colloidal particles are covalently liked to the specific ligand of the colloidal particles (claim 24).

The teachings of Tang, *et al.* (NAR, 2001) are summarized above (see section 5, above). Schaertl, *et al.* teaches use of nanoparticles labeled with antibodies or other specific binding partners in an ELISA type assay (see, for example, Fig. 1, page 228). One of the species of nanoparticles used was non-replicating E. coli which inherently possesses a natural lipid bi-layer capable of presenting the capture agent to liquid phase. A second format taught by Schaertl, *et al.* is a synthetic nanoparticle to which binding agents are covalently attached to the

nanoparticle. Furthermore, as with the assay of the instant Application, the assay of Schaertl, *et al.* can be performed in a homogeneous format.

It would have been obvious to use the nanoparticles of Schaertl, *et al.* in the assay of Tang, *et al.* to increase the range of analytes available for detection. A skilled artisan would have been motivated to use E. coli or synthetic nanoparticles as a nanoparticle in Tangs' assay because of the common desire of both groups to specifically detect analytes, especially those in low concentrations. Said skilled artisan would have a reasonable expectation of success, especially when expressing antibody-like molecules on the surface of the bacteria or attaching them to nanoparticles, because clumping of either nanoparticle would occur because of the multivalent nature of the particles. Thus, the invention of claims 22-24 and 31 are *prima facie* obvious and the claims are properly rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, *et al.* in view of Schaertl, *et al.*

Applicant's arguments filed 3/9/2009 have been fully considered but they are not persuasive. Applicant incorrectly refers to a non-Patent Literature (NPL) reference to which the Examiner did not cite in the previous Office Action. Because of this error, Applicants' arguments are moot, not germane and therefore are not persuasive.

8. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, *et al.* (NAR, 2001). Claim 26 is drawn to a composition for detecting pre-specified analytes comprising nanoparticles that undergo phase transition in the presence

of the analytes comprising transition of a condensed phase to a dispersed phase. As explained above, Tang, *et al.* teaches phase transition of a dispersed phase to a condensed phase. However, it is very well known and long practiced in the analytical arts to utilize so-called competitive binding assays to kinetically characterize analytes. In such assays, the skilled artisan may employ the same capture probe (specific to the analyte) in both solid and solution phase to determine affinity constants or, in other formats, a non-identical inhibitor of capture probe-analyte binding.

It would have been obvious for a skilled artisan to utilize the composition of Tang, *et al.* in a competitive format to arrive at a system that detects pre-selected analytes by monitoring a phase transition from condensed phase to dispersed phase. The skilled artisan would have been motivated to further characterize detected analytes kinetically or to determine/discover inhibitory entities. The skilled artisan would have a reasonable expectation of success because of the ubiquity and success of competitive methodology. Thus, the invention of claim 26 are *prima facie* obvious and the claims are properly rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, *et al.*

9. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tang, *et al.* (NAR, 2001) in view of Faulds, *et al.* Claim 29 adds the limitation that the means for detecting comprises a microscope. Faulds, *et al.* teaches using a microscope for detecting Raman scattering of light from amphetamine sulfate adsorbed to colloidal surfaces (see page 283).

It would have been obvious to use a microscope in the method of Tang, *et al.* because of the common desire of each investigative group to detect analytes using colloidal suspensions to adsorb the analytes and subsequently detect a physical change of the colloids. A skilled artisan would have reasonable expectation of success in using a microscope in Tang's method because of the ease of viewing clusters of colloidal particles. Thus, each and every limitation of claim 29 is taught by the combination of Tang, *et al.* and Faulds, *et al.*; the invention of claim 29 is therefore *prima facie* obvious over Tang, *et al.* and Faulds, *et al.* and properly rejected under 35 U.S.C. 103(a).

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Conclusion

11. No claims are allowed.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to STUART W. SNYDER whose telephone number is (571)272-9945. The examiner can normally be reached on 9:00 AM-5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry R. Helms can be reached on (571) 272-0832. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mary E Mosher/
Primary Examiner, Art Unit 1648

Stuart W Snyder
Examiner
Art Unit 1648

sws